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# The Massachusetts Medical Society.

## COMBINED MEETING OF THE SECTIONS OF MEDICINE AND SURGERY, JUNE 19, 1918.

## The Treatment of Organic Heart Disease in Pregnancy and Labor.

By Franklin S. Newell, M.D., Boston.

The amount of space devoted by the various text-books to the discussion of abnormal conditions of the heart, as complications of pregnancy and labor, would suggest that these complications are both relatively infrequent and of minor importance, were it not for the accompanying statistical tables, which indicate that attempts at childbearing by women suffering from organic heart lesions are attended with a relatively high immediate mortality for both mother and child, and a much higher maternal morbidity.

Judging from my own experience only, cardiac lesions of sufficient gravity to give rise to more or less serious symptoms either during pregnancy or at labor are relatively frequent, and their successful treatment calls for the most careful judgment, not only to avoid serious dangers during the present pregnancy and labor, but to safeguard the future well-being of the patient, and the problems which may arise are by no means simple ones.

There seems to be at the present time no agreement among internists as to the frequency with which heart lesions complicate pregnancy or as to their importance as a complication. Statistics show wide variations. One authority estimates that valvular lesions of the heart occur in 2% of all pregnant women, while another writer reports a 10% incidence. A similar variation occurs in the importance attached to the cardiac lesions as complications of pregnancy, one authority claiming that the discovery of a mitral stenosis during pregnancy is sufficient ground for the immediate termination of the pregnancy, even though the lesion may not as yet have given rise to symptoms, whereas another states that he does not fear heart disease as a complication of pregnancy and labor. When such marked differences occur among specialists in regard to the frequency and importance of any condition the practitioner may well be puzzled in regard to the prognosis and treatment of such cases.

Until the internists can agree as to what constitutes an organic heart lesion there will always be a difference of opinion as to the frequency and seriousness of heart conditions as complications of pregnancy. If we are to believe that every heart murmur which appears during pregnancy in the complete absence of symptoms is an indication of organic disease, it is fair to assume that 10% of all pregnant women suffer from heart lesions, about four-fifths of which are of little or no clinical importance. On the other hand, if we consider only the murmurs which are also present in the non-pregnant state as evidence of organic disease and exclude the transient murmurs, considering them simply as evidence of temporary cardiac insufficiency under increased strain, the frequency is approximately 2%, but the importance is much increased, since in each case serious symptoms may arise, and there is little doubt but that the majority of true cardiac patients are affected more or less harmfully by the strain of pregnancy.

It would seem to be a fair estimate that about 2% of all pregnant women show cardiac lesions which give signs antedating pregnancy and persisting after delivery, and it is with this 2% that we are particularly concerned. In addition, from 6% to 8% of pregnant women develop a slight murmur during pregnancy, which disappears shortly after delivery, and which is so slight as to be negligible from a practical standpoint, and, therefore, can hardly be classed as an organic lesion.

The object of this paper is to offer a rational method of treatment, both during pregnancy and at the time of labor, for patients in whom a definite cardiac lesion is present, in the hope of setting a standard for the treatment of such cases, inasmuch as no such standard exists today in general practice, and the lives of many women are lost and the health of many others unnecessarily sacrificed by a lack of appreciation of the fact that every patient who has an organic heart lesion must receive careful observation and treatment during pregnancy, if serious consequences are to be avoided, at least in a considerable proportion of the cases.

It has long been taught that the extra work thrown on the heart during pregnancy results in considerable hypertrophy, and although recent observations have thrown some doubt on the degree of cardiac hypertrophy which takes place, it is presumable that the extra work which the heart is called on to perform during pregnancy must be met by some hypertrophy. There is no doubt but that the heart is called on to do extra work during pregnancy, and as evidence of this we find many patients in whom symptoms referable to the heart appear for the first time during pregnancy although no organic lesion can be demonstrated, which is an indication that some increased strain is present. This limitation of cardiac response in patients who have no demonstrable organic lesion would suggest that pregnancy must affect the diseased heart even more seriously, and it is a matter of common experience that patients known to have valvular lesions which have remained perfectly compensated under the ordinary conditions of life frequently develop more or less serious decompensation during pregnancy. Furthermore, it is a fact that although a patient with an organic heart lesion may pass through one or more pregnancies safely and without showing signs of cardiac failure, the heart will eventually decompensate under the strain of repeated pregnancies, thus proving that although examination shows no increase in the cardiac lesion during a rest period, the strain of successive pregnancies in time exhausts the cardiac reserve and produces decompensation, irrespective of the lesion present in the given case.

The nature of the lesion is of great importance both in prognosis and treatment. Statistics would seem to show that mitral stenosis is distinctly more serious than the other valvular lesions, although this is denied by some observers. Next in importance come the lesions of the aortic valve, and last mitral regurgitation. Combined lesions are relatively more serious than a lesion of a single valve, especially if mitral stenosis is present. Probably more important than the actual lesion itself is the condition of the heart muscle, and this is a factor which I believe can never be accurately determined. We recognize that of ten patients with a given lesion eight will respond to the strain of pregnancy in a given way, but in my experience it is impossible to determine which of the patients are the two who will respond abnormally. Repeated consultation with internists leads me to believe that it is impossible to predict accurately which heart will decompensate under the strain of pregnancy and which will respond satisfactorily, although an accurate prognosis for the majority can be given. We have, therefore, no definite criterion on which to base the prognosis in a given case, although when a patient has never suffered from an attack of decompensation at any time, it is fair to assume that with care pregnancy may be brought to a successful issue, but the previous history, age of the patient, and the nature of the lesion must also be taken into consideration. As a general rule the patients close to the end of the childbearing period with a given lesion are less liable to respond favorably to treatment than younger women, and patients who have never had attacks of decompensation are better risks than patients who have already had symptoms of cardiac failure.

There are several problems which arise in practice as to the proper course to be pursued in a patient who is known to have a valvular lesion of the heart; first, shall such a patient be advised that it is reasonably safe for her to have one or more children, or shall pregnancy be interdicted? Second, when a patient who has a valvular lesion becomes pregnant, with or without advice, under what circumstances shall pregnancy be allowed to go on; when shall it be terminated; and if abortion seems advisable what method shall be employed? Third, what method of delivery shall be carried out in a given case, if the patient is allowed to go to term? Before considering these questions I wish to state that it is my firm belief that every patient who suffers from organic heart disease will lessen her cardiac reserve in the attempt to bear children to such an extent that her life will be definitely shortened. Just how much damage will result depends on the care which she receives during pregnancy and the method of delivery which is selected, more than on any other factors, but I believe that in every case the added burden of pregnancy will reduce the cardiac reserve to some extent, and, therefore, definitely shorten the patient's life, and that in patients who are suffering from mitral stenosis the danger of immediately serious complications is always present.

What advice shall we give a patient with an organic lesion in regard to marriage and pregnancy? The common practice in years past has been to advise a patient known to have an organic lesion that marriage was inadvisable, and that if she did marry pregnancy was to be avoided under all circumstances. If we are to take the position that prolongation of life to the last possible moment is the only standpoint from which we can advise a patient, this dictum expresses accurately the best advice, but it is impossible to formulate such a rule without doing serious injustice to the majority of patients who have valvular lesions. There can be no question but that the majority of these patients can marry and bear children without immediately serious consequences, if they receive proper care during pregnancy and if labor is properly conducted, although some damage to the heart will result. It is, in my opinion, unfair to condemn this class of cardiac patients to a life of single blessedness or, if they elect marriage against advice, to forbid their having one or more children, according to the cardiac condition, as long as the risks involved and the price which must be paid are carefully explained to both husband and wife and are accepted by them. The great majority of the patients who have come under my observation in private practice declare that the pleasure of having children more than compensates for any shortening of life which it involved, and I believe that in the great majority of these cases the preference of the patient should receive careful consideration, but every patient must be told that in spite of all precautions the strain of pregnancy on the damaged heart may prove to be such as to necessitate a termination of the pregnancy with loss of the child at any time, and that if such symptoms arise calling for radical treatment, her future condition will never be as good as if she had not attempted childbearing, and that she may be a cardiac invalid as a result of the attempt. Any patient who has had attacks of decompensation, whether during previous pregnancies or under the ordinary conditions of life, should be told that pregnancy carries with it such dangers that under no circumstances shall the risk be run. In a patient of this sort, even with the best care, pregnancy is almost sure to bring on serious decompensation which may result fatally, even though the pregnancy be interrupted at the beginning of serious symptoms. In other words, the added burden which a single pregnancy throws on the heart will have only a remote effect in the majority of patients who have never suffered from decompensation, but will have a very serious immediate effect in the majority of patients in whom the cardiac reserve is known to be limited, and in the latter class childbearing should be absolutely forbidden.

*The Treatment of Patients With Cardiac Lesions*: When, as usually happens, a patient who is the subject of a cardiac lesion first consults her doctor as to the advisability of pregnancy after the pregnancy is an established fact, the problem as to her treatment is a complicated one. We must decide first whether the pregnancy should be allowed to go on or should be immediately terminated before the strain on the heart becomes evident, and this must be decided by a consideration of the previous history taken in conjunction with the physical findings. If it is decided to allow the pregnancy to go on, careful supervision must be insisted on, and if the patient goes to term, or nearly to term, without showing the effects of strain or with but slight reaction, the method of delivery must be carefully selected to suit the conditions present in the individual case.

It is impossible to separate these cardiac cases into general groups that can be treated along given lines. Each patient must be treated as an individual and her reaction to pregnancy carefully studied. In the case of a patient whose heart has always been well compensated and who consults her physician in apparently good health, except for the lesion, a routine treatment can be carried out which will safeguard the patient as far as is possible. The patient should be under careful observation from an early date, and in the latter half of pregnancy should be seen at least every week by her physician. Active exercise must be forbidden during pregnancy in order that no additional work should be thrown on the heart. Such patients should be warned against going over the stairs more than is absolutely necessary; daily rest periods are essential; and I believe that even in a patient who has had no threatening symptoms a routine policy of one day a week in bed in order to rest the heart is a wise one. The diet should be carefully regulated, easily digestible food being prescribed in small amounts at frequent intervals. Particular attention should be paid to the action of the bowels. The blood pressure should be watched carefully and a rising pressure should cause deep concern and call for appropriate treatment. The urine should be examined at weekly intervals. The appearance of even slight symptoms of decompensation, dyspnea, rapid pulse, etc., should be met promptly by rest in bed and the use of digitalis. Sunlight and fresh air should be obtained without active exercise.

Many patients will object to a routine of this sort, feeling that it is unnecessary because they have never suffered from symptoms of decompensation, but our problem is one of prevention rather than cure, and these precautions are wise, although they may prove to be unnecessary in a given case. If a patient has suffered from decompensation in the past, these precautions should be increased. The nature of the heart lesion should be taken into consideration, and patients with mitral stenosis should be watched more carefully, if possible, than patients with other lesions. If signs of decompensation develop in the early part of pregnancy the patient should be put to bed and the attempt made to restore compensation. If this succeeds the pregnancy should be ended as soon as the heart has become compensated, unless the child is of such value that serious risks for the mother, both for life and health, seem proper, and the dangers have been carefully explained to both parents. The termination of pregnancy is to be advised, because it is almost inevitable that the continuance of pregnancy in a patient who has decompensated early in pregnancy under careful observation will result in a more serious decompensation before the end of pregnancy is reached, which may have serious or even fatal results.

The method to be chosen for ending the pregnancy in such patients should be carefully considered. If compensation has been completely restored I prefer to terminate the pregnancy by means of an abdominal hysterotomy and to sterilize the patient at the same time, on the grounds that such a patient should never be exposed again to the risk of pregnancy. In such a case ether is ordinarily safe as an anesthetic, though operation under paravertebral or local anesthesia may be preferred. If the attempt at restoration of compensation fails, the only hope for the patient is immediate abortion, and the method chosen may determine the question of life or death. The most conservative treatment in these cases is, I believe, a vaginal hysterotomy under spinal or paravertebral anesthesia, a general anesthetic being badly borne in such patients, to be followed at a later date if the patient's condition warrants, by sterilization, since under no circumstances should a patient who has once suffered from a serious break in compensation early in pregnancy be allowed to risk a future pregnancy.

In the latter part of pregnancy after the child is viable the same general lines of treatment should be followed. If the failure of compensation occurs at about the seventh month the patient should be put to bed and the attempt made to restore compensation. If this is successful and no subsequent signs of decompensation develop, the patient should be carried along under careful observation to about two weeks before the estimated date of labor and then delivered, preferably, at least in the case of a primipara, by the abdominal route, though in a multipara with a soft, easily dilatable cervix, labor may be induced by the use of a bag or a manual dilatation may be performed. At this date the risk to the child will be slight and the importance of saving the heart from the strain of the last two weeks of pregnancy is considerable, although if abdominal palpation shows the child to be definitely undersize it may be wise to wait for a week or even longer, unless symptoms arise calling for early interference, for the reason that after the patient has undergone such risks for the sake of having a living child, the interests of the child should be considered, unless they are in direct conflict with the interests of the mother. Vaginal delivery in a patient of this sort labors under the disadvantage of being an incomplete operation, for such a patient should, in my opinion, be sterilized in order that under no circumstances should a future pregnancy occur, and in primiparae especially the abdominal route is the safer. If the heart is compensated ether will usually be well borne, but otherwise local or paravertebral anesthesia is advisable. If the attempt at restoring compensation is unsuccessful the uterus must be emptied promptly without regard to the interests of the child. I believe that in such a case the abdominal route under local or spinal anesthesia is the safer, delivery to be followed by sterilization in all cases. If the vaginal route is chosen and the patient makes a satisfactory recovery sterilization at a later date is advisable.

*The Method of Delivery in Cardiac cases*: When a patient with a cardiac lesion has been safely brought through pregnancy either without showing signs of decompensation, or after failing compensation has been restored by treatment, the problem to be met is what method of delivery shall be adopted which will give the most uniformly good results. It is impossible to lay down a definite rule and say that it must be followed in all cases, because the conditions present in the individual case must determine the choice of treatment. A great deal will depend on the nature of the lesion, the condition of the soft parts, and the estimated condition of the heart muscle, and patients must be divided into general groups according to these factors.

We shall first consider the method of delivery in primparae with more or less rigid soft parts. In patients with mitral stenosis or with a marked aortic lesion there is no question in my mind but that abdominal Cesarean section offers the safest means of delivery, as the strain of a prolonged first stage, even though followed by prompt forceps delivery at the beginning of the second stage, will undoubtedly throw more strain on the heart than an abdominal delivery, and this added burden will necessarily lessen the cardiac reserve and ultimately shorten the patient's life. In a patient who has had no symptoms of decompensation it can fairly be said that the operation is not immediately urgent, but I believe fully that this method of delivery will prove to be a health-saving operation in these patients. If the patient has had previous failure of compensation, even though fully restored, I believe that the operation is obligatory with due regard to the well-being of the patient.

In multiparae with relaxed soft parts the operation is far less necessary and such patients, if the heart is well compensated, may be allowed to go through the first stage of labor and be delivered with forceps as soon as the stage of dilatation is completed. But even in these cases if there has been a serious break in compensation in the past, I believe that the abdominal route is preferable, especially since in such patients the question of sterilization should be seriously considered, and the abdominal route permits of delivery and sterilization at a single operation.

If compensation begins to fail in a patient in the last month of pregnancy, whether she be a primipara or a multipara, an attempt at restoration of compensation should be made, to be followed, whether successful or not, by Cesarean section and sterilization. In these cases the use of a general anesthetic is doubtful and is absolutely dangerous in patients whose hearts are decompensated when operation is undertaken, and either local or paravertebral anesthesia should be employed.

In patients who have had mild aortic lesions or mitral regurgitation, who have not had previous breaks in compensation, labor may be permitted, but in all cardiac cases the second stage of labor should be eliminated by a prompt forceps delivery as soon as the cervix is dilated. If there have been previous breaks in compensation the abdominal route offers the safest means of delivery for these patients also and sterilization is advisable.

I do not wish to be understood, when urging abdominal delivery for serious cardiac lesions, to mean that the great majority will not pass through one or more labors successfully, irrespective of the method of delivery and of the nature of the lesion, provided the heart muscle is sound at the time of labor; but I do believe that the abdominal delivery will throw less strain on the diseased heart, and, therefore, result in the prolongation of the patient's life by limitation of damage; and I believe that in these cases we should consider not only the immediate result but the remote result as well.

There remains a considerable class of patients who develop cardiac symptoms during pregnancy in whom no definite lesion can be demonstrated; patients in whom the power of cardiac response is evidently very limited, who suffer from shortness of breath, rapid pulse, etc., on the slightest exertion during pregnancy, and yet in whom there is no definite lesion to be made out. It is presumable that many of these patients have a flabby, if not a diseased heart muscle, and that they require similar treatment to the patients who have definite valvular lesions. If rest, absence of all relievable strain and the use of digitalis do not restore the heart to a comparatively normal condition, these patients should be treated exactly as if a definite heart lesion could be made out and the strain of labor should be avoided, the patients being delivered by abdominal section. In certain patients the unsatisfactory heart condition is probably due to a low grade toxemia from which they may not suffer in future pregnancies, but in other cases the symptoms are due to inherent weakness of the heart muscle and successive pregnancies will serve only to increase the trouble; and pregnancy should be absolutely forbidden or the patient will eventually become a cardiac invalid.*

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## HEART LESIONS IN ANAESTHESIA.

BY F. L. RICHARDSON, M.D., BOSTON.

THE general public and, to a lesser degree, the medical profession have a fear of the grave results of anaesthesia on patients with heart lesions. While it is true that patients with heart lesions die while under the effect of an anaesthetic, it is much more often due to the operative procedure than to the anaesthetic, provided the anaesthetic has been wisely selected and properly administered. I am afraid that the anaesthetic and the heart have been made the goat in certain unfortunate cases, whereas the operation or the manner in which the anaesthetic has been administered are the real factors in the case. Please do not understand me as believing that cases with heart lesions offer no greater risks than healthy individuals, for this is obviously not true, but usually they are not as serious risks as they are believed to be. Snow, in one of the most classical books on anaesthesia, says: "If a patient is able to undergo an operation, he will not be an impossible subject for an anaesthetic." After the lapse of almost 70 years there is no reason to change this statement.

Valvular heart lesions that are perfectly compensated and with a reasonable margin of safety offer very little danger from the anaesthesia. When, however, compensation is broken or the margin of safety is very narrow the danger of the anaesthesia increases markedly. In general if the heart lesion does not interfere with the ordinary affairs of life it will not interfere with the taking of an anaesthetic.

Lesions of the aortic valve are more serious than lesions of the mitral valve, and stenosis is more serious than simple regurgitation. Endocarditis and degeneration of the myocardium offer much more serious risks than chronic valvular disease, and I have a great fear of angina pectoris.

In my care of patients with serious disease of the heart of whatever nature it may be, there is one fundamental principle about which all our treatment should center—maintain the bloodpressure at a point as near the level which is normal for that individual as possible. One should keep this in mind in the preoperative treatment, the operative procedure, the selection and administration of the anaesthetic, and in the post-operative care.

Wherever possible, patients with cardiac lesions should be put in bed, if they are not already in bed, and watched for a number of days without any change in their medication or food. The patient should be in about the position that he will have to occupy after the operation. This gives one an idea of how the patient should behave under conditions that would be ideal during convalescence—in other words, it gives us a "base line." Blood-pressure should be taken at least once a day and I wish particularly to emphasize the importance of the diastolic pressure. In this period one has an opportunity of observing the effect of the post-operative position on the condition of the lungs.

The character of the diet before operation should be changed as little as possible from the normal. If the operation is to be at all protracted it is advisable to reduce the fats and increase the carbohydrates. I feel that the giving of 10 to 20 grains of sodium bicarbonate two hours before the operation is of some advantage. Cathartics should never be given unless the patient is in the habit of taking them.

When the time comes for the operation the patient should be carried to the anaesthetizing room and never be allowed to walk or to exert himself in the least. Quiet, but not absolute stillness, should be observed as soon as the anaesthetic is started. Many of these heart cases are high-strung and nervous, and fright is certainly a factor that should be reduced to a minimum, even though it is not possible to eliminate it.

Morphine and atropin should usually be given as preliminary medication and it is necessary that they be given sufficiently early to allow of their maximum action before the anaesthetic is started.

The patient should be placed on the operating table in a comfortable position. If the patient has been in the habit of sleeping with 3 or 4 pillows there is a reason for it. The patient has discovered the position in which he sleeps most comfortably and no preconceived ideas of ours should interfere with his comfort. There is a more potent reason for this than the simple giving way to the patient's whim. If one wishes to have a smooth induction it is necessary to have the patient physically as well as mentally comfortable. If this usual sleeping position of the patient is not compatible with the operative procedure the position should be changed very gradually after the patient is fully anaesthetized, for any sudden change may cause a serious interference with breathing or heart action. It is particularly necessary to change the position gradually when Trendelenburg is required, and the surgeon should be willing to dispense with this position in case of serious interference with the cardiac or pulmonary function, even if very inconvenient for him.

With regard to the selection of the anaesthetic. If the operation can be performed *without pain* under local anaesthesia and the patient is not too apprehensive, this offers by far the least risk. It must be remembered that many operations that can be performed under local anaesthesia without pain are not without certain sensations, namely, the feeling of pressure and traction, which may be interpreted as pain by a nervous and apprehensive patient. The fear in these instances may be a greater element of danger than the taking of a general anaesthetic would be. Fear and pain will drive up the blood-pressure just as surely as ether or nitrous oxide, and the exhaustion following a long operation under local anaesthesia is a factor that must be given proper consideration.

Spinal anaesthesia should never be given to patients in whom the compensation is broken or in whom the margin of safety is narrow. It is a good rule not to use this form of anaesthesia in any patient who will not stand a temporary fall in blood-pressure of 50%. Patients with arteriosclerosis stand spinal anaesthesia quite well and they usually have the sluggish nervous system well suited to operations on a conscious patient. Here again one should consider the nature of the operation, for it is generally conceded that spinal anaesthesia is not safe for operations above the umbilicus.

Paravertebral anaesthesia would offer many advantages over local or spinal anaesthesia if it were not for the preliminary dose of scopolamine, a drug that is too much of a depressant and too uncertain in its action to be used in cases with serious heart lesions.

Gas-oxygen, which has been heralded by its enthusiastic supporters as the safest of all general anaesthetics, is in reality far from safe in many cases, especially in cases of broken compensation or angina pectoris. I believe that this danger is probably due to the rise in blood-pressure that is always present to a certain degree and may become quite extreme if rebreathing is excessive or where cyanosis is present. Operations requiring little or no muscular relaxation and of short duration may in many cases be done with less disturbance to the patient under gas-oxygen than under any other form of anaesthesia, but where the operation is of long duration, and especially if muscular relaxation is required, this form of anaesthesia offers certain grave dangers. It must be remembered that great changes in the condition of the patient may occur with alarming rapidity and with little or no warning under this anaesthetic. This may be due to the rapidity of the action of nitrous oxide or to the nature of the surgical procedure. Whatever the cause of these changes, they are none the less alarming and dangerous.

One of the advantages claimed by the enthusiastic supporters of gas-oxygen is the rapidity with which the patients regain consciousness after the operation is completed. This is certainly dramatic; but is it a real advantage? If the operation is one that will be followed by much pain the patient regains full consciousness at a time when this pain is at its height, and this may in part counterbalance the advantages of this form of anaesthesia. The pain is much less if the technic of Crile is followed out, but there is the loss of some time in doing the local anaesthesia.

Another advantage claimed for gas-oxygen is the lack of nausea and vomiting,—matters of considerable importance,—especially in heart cases. In my hands I believe that almost as many patients vomit after prolonged gas-oxygen anaesthesia as after ether, but the duration and severity of the vomiting are much less. This is a real advantage.

Ether, like gas-oxygen, drives up the blood-pressure; but to a less extent, if properly given. Ether is a cardiac stimulant of more even action. Its use is usually followed by a period of deeper and longer depression than gas-oxygen, and it is this period of depression, following the administration of ether, that one should fear rather than the actual operative period. There are hardly any patients with heart lesions who will not go through the operative period with an ether anaesthesia, but some of these patients will not survive this period of depression following. To a certain extent the length and severity of this period of depression are governed by the depth of the anaesthesia and the length of the operation.

Chloroform, unlike gas-oxygen and ether, lowers the blood-pressure. Chloroform has certain advantages over ether. It is not unpleasant to take and it is somewhat quicker in its action. There are three periods of danger in its use. (1) Probably the highest percentage of fatalities in patients with heart lesions occurs during the induction, where with little or no warning the heart action stops. When this occurs it is not often possible to resuscitate. (2) The second period is during the maintenance, and the danger here is much less than in either the first or the third periods. (3) The third period is from 3 to 5 days after the operation and is due to the toxic action of the chloroform on certain organs, notably the liver, adrenals and heart muscle. Unfortunately, this action has not been recognized until quite recently; deaths occurring during this period being attributed to other factors than the anaesthetic. I do not feel that we are yet in a position to estimate the seriousness of this danger period, though I believe that it is of real importance.

Theoretically, it would seem as if we should be able to combine ether with chloroform in such a way that there would be little or no change in the blood-pressure. This has been tried for many years, notably by the English in the various A. C. E. mixtures. A mixture of ethyl chloride, chloroform and ether has been commercially exploited and largely used in America, but I believe it is now falling into disuse, as are the A.C.E. mixtures of the English. These various mixtures of chloroform and ether are much like the "standing orders" for the use of various drugs at some of the hospitals. They fit some cases admirably but are quite unsuited to other cases. The addition of a little chloroform to the mask is very useful where inducing anaesthesia with ether, but the mixture should be made on the mask as indicated and not according to any preconceived formula. A very little chloroform dropped on the mask with the ether shortens the period of induction and reduces the amount of excitement. It also diminishes the rise in blood-pressure that is seen with a straight ether induction. Chloroform will also quiet the cough of a patient with bronchitis, but it is very rarely desirable to continue its use after the period of deep anaesthesia has been reached.

During the post-operative period it is more important in these heart cases than in the ordinary cases to prevent any unnecessary overload and to maintain the nourishment of the patient at a high level. Overload may come from various causes; among them kidneys and intestines play a large part and it is necessary to keep them functioning properly. Water should be given freely. When for any reason it cannot be given by mouth it must be given either by rectum or subpectorally, and in rare instances intravenously. It is advisable to begin food by mouth very early, and when I speak of food I do not mean beef tea and chicken broth; I mean food of real caloric value. When a patient cannot take food by mouth within 18 hours it is advisable to give nourishment by rectum. Glucose may be given by rectum in 5 to 10% strength and liquid peptanoid may be added to this if desired or wherever rectal feeding has to be given over a protracted period.

The urine should be carefully watched for acetone, and to those cases showing a considerable rise, sodium bicarbonate should be given in small and repeated doses. Of the so-called heart stimulants, most are absolutely useless. The judicious use of morphine must not be forgotten. More heart cases require rest after the operative period than require stimulation.

In conclusion, I wish to emphasize the importance of attention to the careful and detailed treatment of heart cases during the preoperative and post-operative periods as well as during the operation and anaesthesia.

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### DISCUSSION.

**Sir James Mackenzie**, London: I have been long deeply interested in the two questions under discussion—of the heart in pregnancy, and in anesthesia. As a matter of fact, one of the chief reasons for my interest in cardiac affairs arose from the study of the heart in pregnancy. About a year or eighteen months after I entered practice a woman, with mitral stenosis, whom I attended, died in labor after thirty-six hours of great suffering, from heart failure. There arose in my mind the question whether I could not have saved her had I a better knowledge of the subject. For that reason I studied the literature to see where I had failed in my duty toward her. I found that the subject was fairly well summed up in a book written by Dr. Angus MacDonald of Edinburgh in 1876. Lately I have read some recent literature on the subject, and I find that obstetricians had evidently made no advance on MacDonald's book. The subject is of importance to every general practitioner, for the question is not seldom put to him whether a woman with a heart affection should run the risk of pregnancy, and so much depends upon his answer. Yet it is a subject which has received little consideration. The reason for this is that the physician never sees a childbirth, and the gynecologist rarely sees a case of heart failure.

I had ample opportunity in my practice for investigating the effects of pregnancy on the maternal heart. The method I followed was to examine women before pregnancy, and watch them during pregnancy and during labor, and through the puerperium, and after recovery and in some cases during repeated pregnancies, making notes of all circulatory changes. After a number of years I had a lot of facts collected about the heart in pregnancy. I found variations in the size and shape of the heart, modifications of the sound, and variations in the rhythm, and sometimes the veins of the neck became distended with marked pulsation. I wanted to know what all these signs signified. I turned to the text books and I could not find from them what bearing they had on the matter.

To get a clear conception of the nature of the danger I put the question, "What are you afraid of when a woman with a heart affection becomes pregnant?", and I found that it was a fear that the heart might fail. Then the question arose, "What is heart failure, and what are the phenomena that heart failure produces?" As a rule, the evidences of heart failure that are described in books are such signs as dropsy and enlargement of the liver. But what are the phenomena before such an advanced stage is reached? If ever the danger is foreseen, we must know by what signs heart failure in the early stages is to be detected. Text books as a rule are silent on this subject, and there did not then exist a clear conception of the matter.

When I perceived certain abnormal signs the questions arose: "Are those the signs of heart failure? Does this murmur indicate heart failure? Do these irregularities indicate heart failure?" When I turned to my books to find out the significance of these particular phenomena, still I could get no answer. The only thing left for me to do was to take a number of these cases and watch them, and see what happened. Thus I began to study heart failure, and especially in heart disease complicated with pregnancy, some thirty-five years ago, and I have not settled the matter yet. During that time I have collected data which give me a certain amount of knowledge by which I can in most cases speak with confidence as to whether a heart can bear the strain of pregnancy.

Mitral stenosis is recognized as a dangerous complication in pregnancy. This subject I particularly studied to see if I could recognize the reason for danger. I began with cases that suffered from rheumatic fever, and watched them for years to see what happened to them. I found that after an attack of rheumatic fever there is never any evidence of mitral stenosis to begin with. The symptom of stenosis never appeared until years after the damage was done by the rheumatic fever. The reason is that there first occurs an ulceration of the mitral valves which heals by cicatrization, and it is the amount of damage done to the valve that constitutes the danger. If the case is a severe one and cicatrization occurs rapidly, the murmur of mitral stenosis appears within a year or two of the causative attack of rheumatic fever, but at first there is no presystolic murmur, though there may be a systolic murmur. The first sign of the presence of mitral stenosis is a thrill before the apex beat. Later there appears a short presystolic murmur, not always present; then as the disease progresses and the narrowing becomes greater, the presystolic murmur becomes long and persistent. When the narrowing becomes still more advanced there appears, in addition to the presystolic murmur, a diastolic murmur. The presystolic murmur is due to the obstruction at the mitral orifice during auricular systole to the passage of blood into the ventricle. The diastolic murmur is due to the fact that the blood accumulates in the auricle during ventricular systole, and the rush of blood into the ventricle at the end of ventricular systole causes the murmur.

Therefore in a patient with a short presystolic murmur there is only a small degree of stenosis, and with a long presytolic murmur there is a great degree of stenosis. Now when you get a woman coming to you who twenty years ago had rheumatic fever, and there is a short presystolic murmur, then you can say the prognosis is good, because a long period has supervened since the causative attack of rheumatic fever and the stenosis is slight in degree and the cicatrization is slow. But if you have a long presystolic murmur, and in addition a diastolic murmur, then the stenosis has become very great.

At the same time, by studying the symptoms induced by heart failure, I was able to recognize the phenomena which serve as a guide in determining the safety of pregnancy to a woman with a heart affection.

Heart failure is best recognized by the limitations of the patient's power to respond to effort. Many healthy women become very breathless during pregnancy, and it is necessary to be sure in any given case whether the breathlessness is due to a failing heart, or merely due to the embarrassment caused by the abdominal tumor. Patients with a systolic murmur and no other sign never show any serious signs of heart failure. It must be remembered that the great majority of systolic murmurs, especially in pregnant women, are physiological in origin, and are indicative neither of disease nor of impairment.

The dangerous forms of valvular disease are mitral stenosis and aortic regurgitation. In mitral stenosis, the character of the murmurs, the length of time since the causative attack of rheumatic fever, and the response of the heart to effort are the chief factors on which a safe prognosis can be based. If the murmur is short, and the attack of rheumatic fever over five years before, and a good response to effort, then the pregnancy may be permitted, provided the patient can be watched for early signs of heart failure, and severe bodily work avoided.

With a long presystolic murmur, and particularly with a diastolic murmur, the heart response to effort will usually be found so limited that pregnancy would be dangerous. In the few cases of aortic regurgitation I have seen, though the patients came through the puerperium, the heart was so permanently weakened that they all drifted and died of heart failure. In auricular fibrillation the patients have not gone to full term, and all were permanently made worse by the pregnancy. Patent ductus arteriosus does not have any bad effect, and the few cases I have seen have borne the pregnancy without trouble.

In regard to chloroform anesthesia, I do not want to speak in any sense as an authority on anesthetics, except in so far that I was brought up in the school of Syme and Lister, and have practised their principles. I have given a good deal of attention to its effect upon the heart. In Edinburgh, we, as students, were given charge of half a dozen cases in the surgical ward, and each was responsible for the giving of chloroform. We were taught the principles in which the method was employed, namely, to watch the physiological effect. Up to 1877, there had never been a death from chloroform in Edinburgh Infirmary. In speaking to one London anesthetist, he said he had 20,000 cases without a single death. On the other hand, there are hospitals where one death occurs in 3000. You can draw your own conclusions.

How does chloroform act? The following theory suggests an explanation: The most recent developed part in the body is the part most particularly subject to certain poisons. The spinal column of a child shows no cervical enlargement. This comes later, after the child uses the fingers in making many movements. The cells that preside over these movements increase in number so that the cord bulges where they are deposited. The same principle applies to the development of the speech center. We have got the muscles there for other purposes and later we use them in speaking. A drunken man trying to write cannot make the fine movements of the fingers, yet he can lift the glass to his lips. Those muscles are not paralyzed, and yet he cannot make the fine movements—the latter developed cells are paralyzed. In chloroform anesthesia it is the mental processes—the latest developed functions—that are affected first; afterwards the power of speech goes, then the loss of sensation and the loss of motion. That is to say, we have got a degree of anesthesia affecting the most recently developed parts, while the nerve centers that preside over respiration and other organic reflexes are not reached till a later stage. It is at this stage, between the time sensation is abolished and the time when the organic reflexes are affected, that it is safe to operate.

Thousands of healthy people have been carefully observed, and the result is uniform—a loss of sensation and of the superficial reflexes such as the conjunctival, the safe stage of anesthesia, the respiratory center remains unaffected, and the heart's action is undisturbed. If in careful chloroform anesthesia death occurs, then it may be assumed that there was some other factor present, probably disease. Moreover, seeing that chloroform can be administered with safety to individuals with advanced valvular disease of the heart and other affections, it is reasonable to assume it is some peculiar affection which predisposes to death from heart failure under chloroform. How is this peculiar form of disease to be discovered? Only by doctors skilled in the knowledge of the different affections of the heart, watching patients when under the anesthetic. It is manifestly absurd to expect the source of danger to be discovered in the physiological laboratory, when the animals experimented on have healthy hearts, and the experimenters have no knowledge of the diseases of the heart.

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## THE NORMAL HEART IN THE NAVY.

BY G. F. FREEMAN, MEDICAL INSPECTOR, U. S. NAVY, BOSTON.

*Mr. Chairman and Fellows of the Massachusetts Medical Society:*

I fully appreciate the honor of being present to represent the Medical Corps of the Navy, and will give a brief résumé of what investigation I have carried on in regard to that most perplexing question, "What constitutes a normal heart as far as the standards of the Navy are concerned?"

At one time I kept notes for statistical purposes of the examinations of several hundred cases in the Navy enlisted personnel, and wrote a short monograph, some copies of which are at hand. I have since that time been more especially interested in the subject and have confirmed these observations. I am not a heart expert, but any one in the Navy, listening to so many normal hearts, in the repeated examinations we have to make on the same individual, must draw some conclusions as to what he thinks is normal, inasmuch as these men stand hard work and the strain of Navy life, and also much exposure, year after year, and certainly their hearts must set a standard at least as high as normal, otherwise they would show some effects on the heart as influenced by this life.

Looking into past history, I am sure that many have been rejected for military service on account of "heart murmur" who had perfectly normal hearts. I know that in my early career in the Navy I affirmed in writing as to certain cases having organic heart disease whom I would now pass as normal, this affirmation being due to a systolic murmur heard at the apex, which did not, unfortunately, disappear at any one time when the man was examined. I have since that time found these murmurs and have listened to the same man again under the same physical conditions and found the murmur gone. It is not uncommon to find on a man's health record these words, "slight systolic murmur at apex," and examine the man several times and find no murmur. Years ago in one of the medical journals I found a short note by Dr. Osler to the effect that many men were rejected for the Army and the Navy on account of these systolic murmurs, without any other symptoms. He ended this note with the words, "thus many good and normal men were lost to the Army and the Navy." Most of us have learned by experience the wisdom of Osler's words, although it is still hard to convince some that most of these murmurs do not mean anything. The irregularities may mean some defect, but these murmurs seldom do. The same position is taken by Sir James Mackenzie in the British instructions: "It should be understood that the healthy heart of the young adult can exhibit murmurs, and variations in rate and rhythm, which are perfectly physiological in origin and indicative of neither disease nor impairment." From personal experience, as quoted by many authors, these murmurs are not transmitted and do not have the other signs of organic disease.

Irregularities are to my mind a source of suspicion, and should be investigated as possibly caused by sinus arrhythmia, extrasystoles, fibrillation, heart block, auricular flutter, paroxysmal tachycardia, etc. The irregularity may mean nothing however, as that caused by respiration, the so-called respiratory irregularity which is physiological. Auricular flutter would naturally lead to a suspicion of myocardial disease and thus be permanent, the old "pulsus irregularis perpetuus." These cases, besides what may be determined by palpation, would show other symptoms, and at least be sufficiently diagnosed to cause rejection or reëxaminations by special boards.

It is also true that often these functional murmurs and the false murmurs disappear on the patient's assuming the prone position. The old rule of systolic murmurs being heard best in the prone position was found to be true during my investigations. In fact, in my statistics there were some cases where the murmur could be heard only in the prone position. It is, therefore, well to examine all cases while they are lying down, even at the expense of a few minutes' time, although extra minutes devoted to each case, when there are a great number to examine, introduces quite a time factor, but it is time well spent, even if the number examined per hour is somewhat less.

Some of the deductions from examinations are as follows, and apply to all classes, both recruits and reënlistments. The average weight at original enlistment was 133.5 for recruits and 151.6 for reënlistments.

### CONCLUSIONS AND OBSERVATIONS.

The normal heart in the Navy corresponds, as far as physical examination is concerned, to the usual descriptions as to size and sounds, rhythm, etc.

1. The apex beat, which is the most important guide in determining the size of the heart, should always be defined. In a series of 200 cases it was found in the fifth space in 89%, in the sixth space in 8%, and in the fourth space in 3%. The apex beat can be felt in all but 4% of cases before exercise, and in all but ½% after exercise. In examining recruits and persons in the service, the heart's size can be defined much better than in the usual clinic, because the subjects are all muscular young men, not obese, and have a vigorous heart action.

2. The apex is, on the average, 9.165 cm. from the mid-sternal line, and the nipple is 10.28 cm. from the mid-sternal line. On ac-

count of class of case examined,—muscular men,—the nipple is a landmark of much greater importance than it is in a mixed city clinic. The apex averages 1 cm. inside the nipple line, but there is a normal variation to outside the nipple line.

3. In 67½% of cases the apex is inside the nipple line. In 10½% the apex is in the nipple line. In 12% the apex is outside the nipple line.

4. In recording the location of the heart's apex, on account of the different shape of chests, it is best to give the distance in centimeters from the mid-sternal line. These measurements are best obtained by marking on the chest and then measuring between the lines marked by the usual measuring tape laid on the chest, and *not* by trying to estimate the distance between the fingers holding the tape, between the points determined. In like manner a measuring rule can be used, but the first method has been more satisfactory, as the tape is always at hand in the examining room.

5. The right border of the heart is best determined by light percussion. In the cases taken the measurement was from the mid-sternal line at the lower border of the second right interspace, measuring from markings on the chest, the point mentioned being very easily determined. It averaged 2.6 cm., or practically one inch from the mid-sternal line. With a sternum of average width, the right border will be found about 0.7 cm. (or about 1/3 in.) from the right border of the sternum, and as this distance is rather too small to estimate by the usual percussion on a finger, it is best to assume that the right border of the heart extends at this point to just outside the sternal margin. The location of the right side of the heart may vary slightly with different observers, as its estimation depends somewhat on individual equation, as does the general outline of the heart if determined by percussion. On the other hand, when we consider the muscular type of man we are dealing with, I cannot agree that the attempt to locate the right side by percussion is of no value, and that the only sure way is the x-ray. I *do* know that in these cases we can percuss the left border accurately because there we have a check on our percussion, viz., the location of the apex beat. Then if we can locate the left side accurately, why cannot we locate the right side also by the same methods? The method used was to percuss with the eyes shut and have an assistant mark the point found.

6. The rate of the pulse on the physical examination of the Navy personnel is accelerated by the excitement which seems to affect the men on reënlistment as well as recruits. The pulse is also increased by exercise (ten sweeps from the erect position and sweeping down to or near the floor), about ten beats per minute in recruits, and seven beats in the reënlistments. A minute's rest is given after the exercise before the pulse is recorded. The average rate of pulse in recruits was 84 sitting, 90 standing, and 93 after examination. This high pulse rate is due to the excitement of being in the examining room. Men who had been in the service from four to twenty years also had a high pulse rate, the average being 87 standing, 87 sitting, and 94 after the exercise.

7. Most of the murmurs heard meant neither an abnormal heart nor heart disease. What could be called a murmur was found in 42% of the recruits who, after passing the recruiting office, were examined for final acceptance. In the reënlistments of recruits, 19% were found with heart murmurs.

In the verification for final acceptance, 4% were found to be not physically qualified on account of some heart condition, and this condition was verified by a board of three medical officers, and thus it was not the opinion of the single examiner. They were not allowed to continue in the service. The cases rejected in 100 recruits who had previously been accepted were as follows:

1. Mitral regurgitation; poor physique.
2. Mitral regurgitation, in a recruit for firemen. As the firemen have to have a very high physical standard, anything that is doubtful cannot be accepted.
3. Tachycardia, constant rate 124, poor physique, bronchitis.
4. Probable mitral stenosis, regurgitation.

In the reënlistments there was ½% rejections on account of heart condition.

The most common murmur found was a systolic one at the second or third left interspace or the apex, and fairly common at the right of the sternum. The systolic murmur at the apex, also accompanied by some heart enlargement and an accentuated pulmonic second, is often found in chance examinations in men in the naval service and cannot, therefore, necessarily mean heart disease, as these men never had and do not under observation have, any symptoms. It is well to record all these murmurs on the health record simply as murmurs, and not to apply to them the name of a heart lesion. The mitral systolic murmur cannot be diagnosed as mitral regurgitation unless there are real symptoms, still I must confess that I was brought up to believe that a mitral systolic murmur meant mitral regurgitation.

I have, perhaps, dwelt too long on this subject of heart murmur in the normal heart, but I find it still the very puzzling problem for examiners, who fear they may pass a man and later have him break down under the strain of the Service. Even were these sounds *bona fide* murmurs, there is no proof at this time that, unless the heart exhibits other symptoms, these men cannot stand the strain of war, especially when we consider the record of men with aortic regurgitation, for instance, who have undergone severe campaigns.

There is no fixed law in the Navy as to what heart condition is normal, and much is left to the individual examiner. It is generally accepted, however, that anything but a mild systolic murmur, either at the base or apex or along the sternal border, will disqualify for the naval service. Standing by itself, the systolic murmur at the apex, whatever its character, should not be a cause for rejection, according to the British Research Committee, of which Dr. Lewis is a member. This decision seems to be sound, and for the murmur to mean anything, there will be an accompanying history or symptoms. In our Naval Service, however, with recruits sometimes not truthful in regard to symptoms, we have to be careful, and if the murmur seems to be a part of an organic heart condition, we cannot accept them, at least without a waiver for physical disability, which is submitted to the Surgeon-General at Washington. Irregularities are also often present in normal hearts, and when not accompanied by an inefficiency, and having a heart of normal size, should not be a cause for rejection. Both of the latter types have been found in men who were absolutely normal as far as physical efficiency was concerned.

Many normal men suffer temporary abnormalities during the excitement of the physical examination by the medical officer, and I have found that the excitement of the examination produces practically the same effect as rather strenuous exercise,—a forcible, rapid impulse and the systolic murmurs mentioned. This also explains the fact that one medical officer will find a murmur and the next medical officer, on a different occasion, will not, obviously because the murmur was not there at the second examination.

In estimating the value of the heart examination in these cases, experience is a great aid to the medical officer, just as it is in detecting the variations in the normal lung. By experience we have found that men with these irregularities and murmurs can perform their duties year after year without any symptoms or change in the heart condition. This heart may vary from what we were instructed in school should be the perfect heart, nevertheless, it is the heart found in hundreds of men who are as near the requisite physical standard as we can find, and thus we call that the normal condition. The standard of what we have heard in these normal men may lead us into mistakes sometimes, but this will occur, I think, very seldom, and as we make mistakes anyway, I do not think that the grand total of mistakes will be increased in per cent.

Up to the present time we have maintained a high physical standard in the Navy, and thus have not required special boards for the doubtful cases; the really doubtful cases are rejected. I have thus confined my paper to the simpler phases of heart examination, the conditions we have had to meet in the past, and not the possibilities of the future.

## THE USE OF THE X-RAY IN THE EXAMINATION OF THE HEART AND AORTA.

BY GEORGE W. HOLMES, M.D., BOSTON.

WHETHER or not an object can be visualized by the x-rays depends upon its relative density to the objects immediately surrounding it. The heart and great vessels (comparatively dense organs), surrounded as they are by the air-filled lungs, offer an unusually satisfactory field for study by this means.

The fact that examination by x-ray has not come into more general use in this field is probably due to two factors. (1) the accuracy

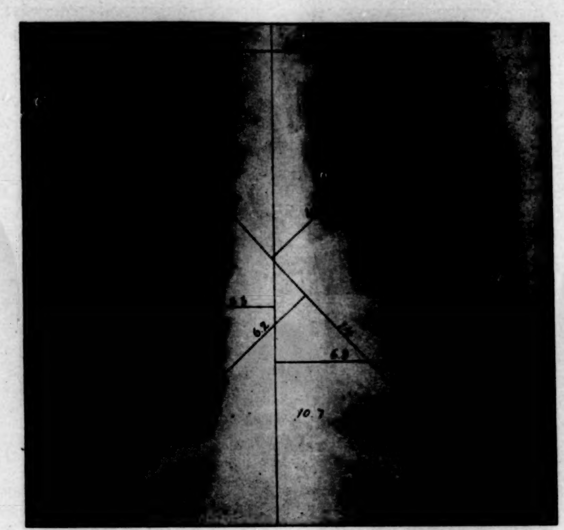

Fig. 1.—Normal heart. (Patient standing; tube film distance, six feet.) The points from which measurements are taken are shown; also the outline of the various chambers. *I* on right is the curve at the ascending aorta, *III* on the right is the curve of the right auricle, *I* on the left is the prominence of the aortic arch, *II* the prominence of the pulmonary artery, *III* curve of left auricle, *IV* curve of left ventricle.

with which most changes within the chest can be determined by the older and more widely known method; and (2) because the shadow of the heart and great vessels as seen on the ordinary x-ray plate is both distorted and magnified, and in drawing conclusion from them the clinician has frequently been led into error.

There are, however, certain lesions of the heart and great vessels, in which an accurate diagnosis by the older methods alone is most difficult and at times impossible. It is this class of cases in which the x-ray examination will be found of the greatest help. By using parallel or nearly parallel rays and by combining with this data that obtained by fluoroscopic observations, the errors due to distortion and magnification can be eliminated.

### DESCRIPTION OF THE HEART SHADOW.

Before calling attention to the appearance of the heart and great vessels in disease, it is, perhaps, desirable to describe briefly their anatomy as seen on the x-ray plate or screen.

The shape of the heart varies in different types of individuals. In the short, deep-chested person the heart is higher and its transverse shadow is wider, giving the appearance of enlargement to the left. In the ptotic, the apex drops downward and rotates backward, so that the heart shadow seems long and narrow. A similar appearance may be brought about by making the observation at full inspiration.

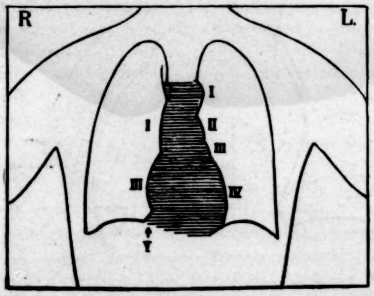

Fig. 2.—Diagram from "Groedel" showing position of chambers of the heart; also position of great vessels.

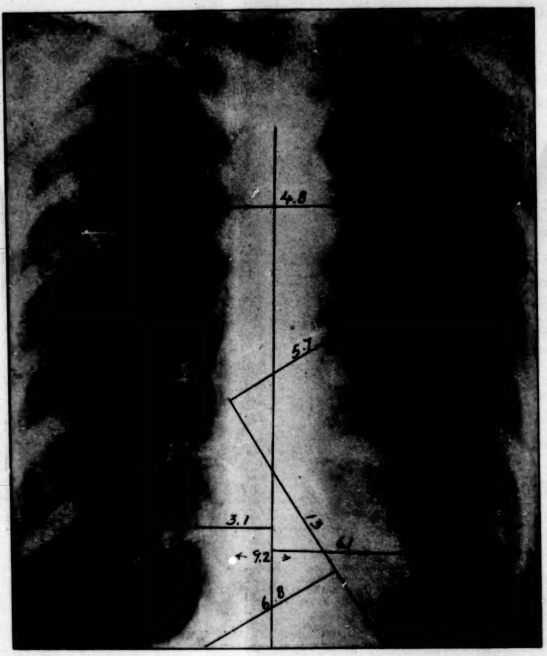

Fig. 3.—Ptosis of Heart and Diaphragm. (Tube film distance, six feet with patient standing.) Note the long, low, narrow heart shadow.

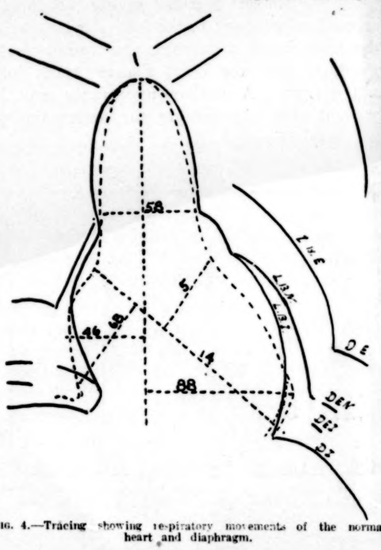

Fig. 4.—Tracing showing respiratory movements of the normal heart and diaphragm.

Respiratory movements of the heart also vary somewhat in different individuals, but are roughly in proportion to the respiratory excursion of the diaphragm. There is some movement with change of position of the patient, but very little change in shape. An exception to this statement is the change of shape of the heart of the ptotic, due to the drop of the diaphragm when the patient is upright.

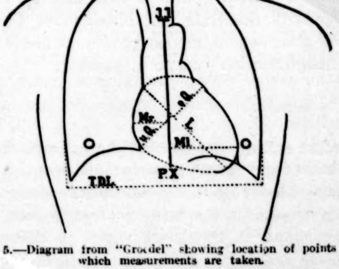

Fig. 5.—Diagram from "Groedel" showing location of points from which measurements are taken.

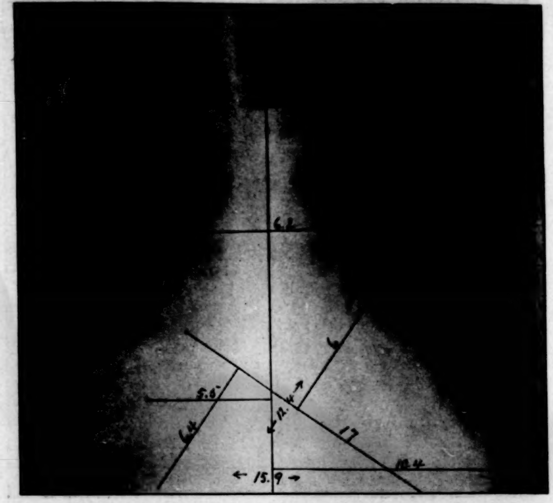

FIG. 6.—Specific Aortitis, proven at autopsy. Note prominence of aortic shadow to the right.

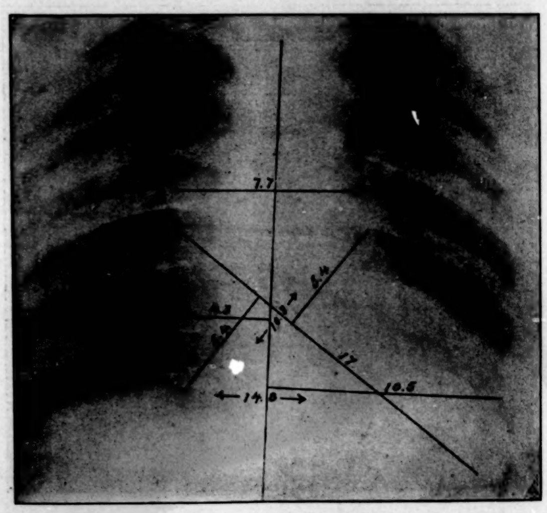

FIG. 6a.—Extreme Dilatation of Aorta Suggesting Aneurysm.

The outline of the heart and great vessels is formed by two curved lines on the right, the upper representing the ascending portion of the aorta and the lower the bulge of the right auricle. On the left, by four, the upper of which is the peak of the arch and the descending aorta; the second (directly below it), the prominence of the pulmonary artery; the third, a short area, sometimes invisible, which is the curve of the left auricle; and a long,

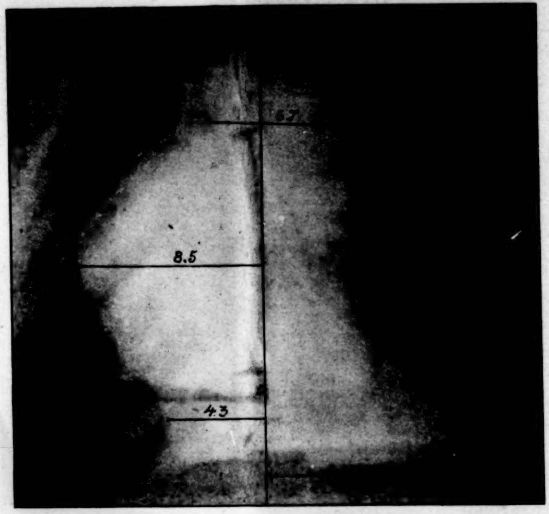

FIG. 7.—Aneurysm of Ascending Aorta.

FIG. 8.—Pericarditis with Effusion. (Patient standing, tube film distance six feet.) Note change of shape as compared with Fig. 8a.

wide curve which forms the greater part of the shadow of the left side, and which represents the outline of the left ventricle.

The right ventricle lies in front of the heart shadow, and is not visible in the antero-posterior views.

The apex of the heart is often below the dome of the diaphragm, and for this reason

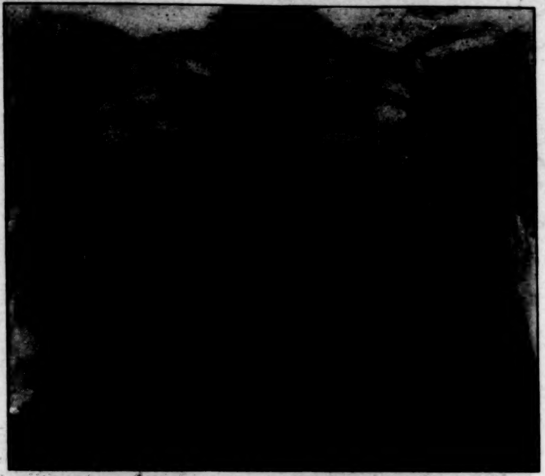

FIG. 8a.—Pericarditis with Effusion. (Same patient as Fig. 8, taken the same day. Patient in prone position; tube film distance six feet.)

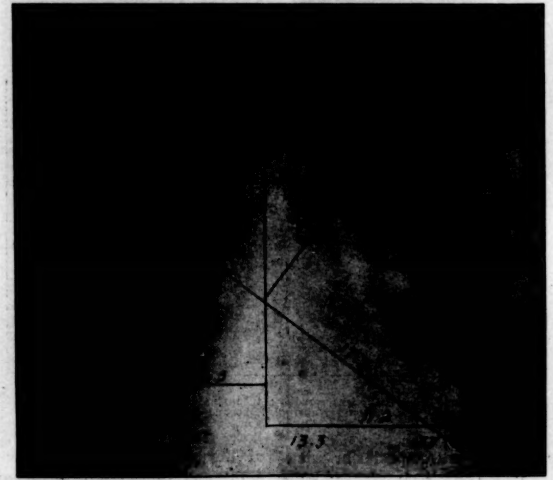

FIG. 9.—Adhesive Pericarditis.

may not be visible on the plates, but it can usually be located on the fluoroscopic screen by its movements.

With a knowledge of the position of the various chambers of the heart, the pulsation in each chamber can be studied and comparisons can be made between the pulsations of the auricles and the left ventricle. Their relative size may help us in determining what, if any, valvular lesion is present.

As the shadow of the assembling and descending portions of the aorta overlap one an-

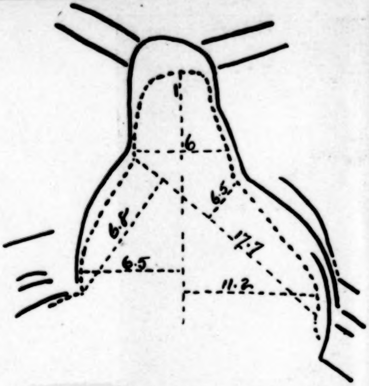

FIG. 9a.—Tracing showing respiratory movements of heart and diaphragm in Adhesive Pericarditis.

other (as seen in the antero-posterior view) the transverse diameter of the mediastinal shadow above the heart does not represent the true diameter of the aorta. It may be increased by a wide curve or diminished by a narrow one, as well as by dilatation of the great vessels. A high position of the heart also tends to widen the curve of the aortic arch and increases the transverse shadow.

### MEASUREMENTS OF THE HEART.

The most desirable points from which to take measurements in determining the size of the heart have been studied by several investigators. Those most generally used are the ones selected by Groedel. They consist of three points on the right and three on the left side of the heart shadow. Those on the right are: (1) at the junction of the heart shadow with that of the great vessels, and (2) at the farthest point to the right, and (3) at the junction of the heart shadow with that of the diaphragm. The upper point on the left is at the junction of the left auricle with the left ventricle. The second is the farthest point to the left, and the third is at the apex.

The median line is usually obtained by drawing a line down the center of the shadow of the spine. From this, the distance to the right and to the left is taken. The point at the apex is connected with the highest point on the right by a second line. This line represents the length of the heart (the distance from the base to the apex). The sum of two lines drawn at right angles to it, connecting it with the lowest point on the right and with the highest point on the left, is the diameter of the base.

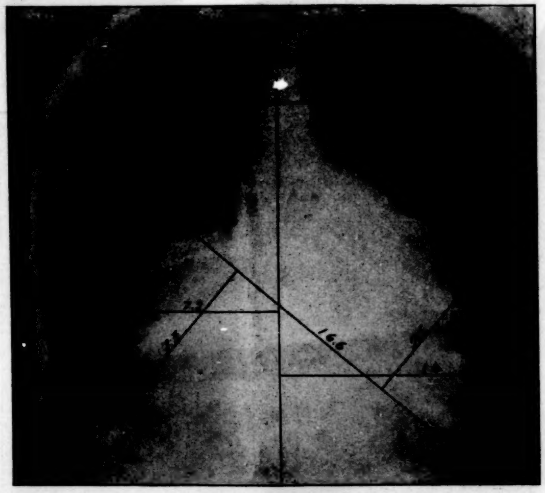

FIG. 10—Mitral Disease. (Patient standing; tube film distance six feet. Note marked prominence in region of right and left auricle.

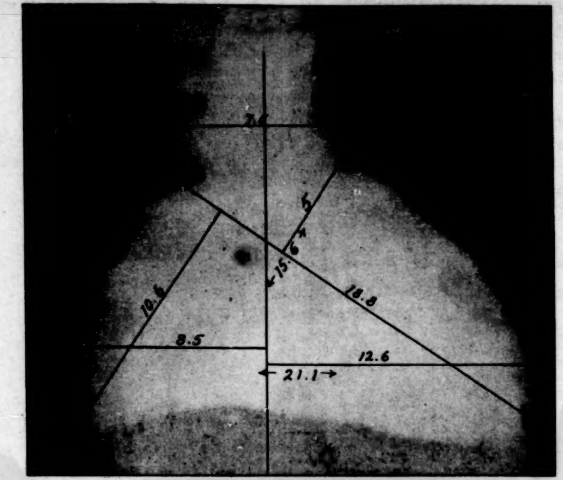

FIG. 11.—Dilated Heart. (Patient upright; tube film distance six feet.)

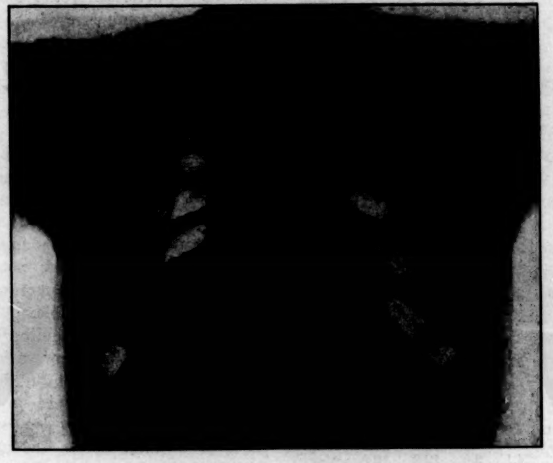

FIG. 12.—Aortic Disease. (Tube film distance six feet.) Note prominence of left auricle. (Compare with Figure 12a.)

If carefully done, these measurements are quite accurate. The ones most subject to error are the relative distances to the right and to the left, as it is difficult to locate the mid-line. The sum of the distance to the right and left (that is, the transverse diameter of the shadow) is very accurate, that is, one may place the heart too far to the right or to the left because of failure to locate the mid-line or because of a slight amount of rotation of the patient at the time the plate was taken. The diameter across the base may vary because of the difficulty in locating the junction of the left auricle with the left ventricle. It also varies somewhat with the position of the diaphragm. The length of the heart is probably the most unsatisfactory of all the measurements because of the difficulty in locating the apex. The following table by Claytor and Merrill gives the measurements of normal hearts of the male and female:

CLAYTOR, MERRILL: ORTHODIAGRAPHY.

Table I. Vertical Heart Orthodiagrams, Male (37 Cases).

| Weight, Lbs. | Cases | Mr. | Ml. | T. D. | L. D. | Min. |
|---|---|---|---|---|---|---|
| 120-129 | 3 | 3.2 | 7.0 | 10.7 | 11.8 | Min. |
| | | 3.7 | 7.2 | 10.9 | 12.6 | Av. |
| | | 4.3 | 7.5 | 11.3 | 13.5 | Max. |
| 130-139 | 5 | 3.5 | 7.5 | 11.0 | 12.0 | Min. |
| | | 3.8 | 8.0 | 11.8 | 13.2 | Av. |
| | | 4.2 | 8.5 | 12.5 | 14.0 | Max. |
| 140-149 | 9 | 3.4 | 7.0 | 11.0 | 12.0 | Min. |
| | | 4.0 | 7.7 | 11.9 | 13.4 | Av. |
| | | 4.6 | 8.4 | 13.1 | 14.5 | Max. |
| 150-159 | 8 | 3.2 | 7.8 | 11.5 | 12.5 | Min. |
| | | 3.9 | 8.4 | 12.3 | 13.5 | Av. |
| | | 4.5 | 9.0 | 13.0 | 15.0 | Max. |
| | | 3.7 | 8.0 | 12.0 | 14.0 | Min. |
| | | 4.2 | 8.7 | 12.9 | 14.7 | Av. |
| | | 4.5 | 9.7 | 13.4 | 15.3 | Max. |

Table II. Vertical Heart Orthodiagrams, Female (54 Cases).

| Weight, Lbs. | Cases | Mr. | Ml. | T. D. | L. D. | Min. |
|---|---|---|---|---|---|---|
| 100-109 | 2 | 3.2 | 6.7 | 9.9 | 12.0 | Min. |
| | | 3.3 | 6.8 | 10.2 | 12.1 | Av. |
| | | 3.5 | 7.0 | 10.5 | 12.3 | Max. |
| 110-119 | 3 | 3.0 | 7.0 | 10.0 | 11.5 | Min. |
| | | 3.1 | 7.6 | 10.7 | 11.9 | Av. |
| | | 3.2 | 8.0 | 11.1 | 12.4 | Max. |
| 120-129 | 14 | 2.3 | 6.4 | 10.2 | 10.5 | Min. |
| | | 3.5 | 7.5 | 11.0 | 12.2 | Av. |
| | | 4.2 | 8.6 | 12,2 | 13.8 | Max. |
| 130-139 | 19 | 3.0 | 6.4 | 9.6 | 12.2 | Min. |
| | | 3.4 | 7.8 | 11.2 | 12.4 | Av. |
| | | 4.0 | 8.8 | 12.6 | 13.3 | Max. |
| 140-149 | 5 | 2.6 | 7.0 | 12.6 | 12.2 | Min. |
| | | 3.5 | 7.6 | 11.1 | 12.7 | Av. |
| | | 4.1 | 8.3 | 11.8 | 13.2 | Max. |
| 150-159 | 7 | 3.1 | 7.6 | 10.9 | 12.3 | Min. |
| | | 3.6 | 8.0 | 11.6 | 12.9 | Av. |
| | | 4.8 | 9.3 | 12.8 | 14.2 | Max. |
| 160-175 | 4 | 3.5 | 6.5 | 10.6 | 11.8 | Min. |
| | | 3.8 | 7.9 | 11.7 | 12.6 | Av. |
| | | 3.8 | 8.5 | 12.3 | 13.0 | Min. |
| | | 4.1 | 9.0 | 12.8 | 13.2 | Max. |

American Journal of the Medical Sciences, New Series, v. 138, 1909, page 554.

The cardiac diseases in which an examination by the x-ray is of value may be divided into two classes: (1) those in which data may be obtained which are not obtainable by other methods, and (2) those cases in which the evidence obtained is confirmatory.

Under the first classification we will place the following:

Dilatation of the aorta and aneurysm.
Pericardial effusion.
Adhesive pericarditis.
Functional murmurs.

The second group will include:

Valvular lesions.
Dilatation and hypertrophy.
Myocardial changes.
Heart block.
Auricular fibrillation.
Congenital abnormalities.
Malpositions.

*Dilations of the Aorta* give a fairly characteristic picture. They may be divided into three distinct types: (1) dilatation of the ascending portion (which is usually specific and which is seen as a sharp bulge to the right just above the curve of the right ventricle); (2) dilatation of the arch, which may be either specific or arteriosclerotic, and which is seen as a sharp prominence of the upper curve on the left; and (3) diffuse dilatation of the aorta, which may be caused by specific disease, arteriosclerosis, or high blood pressure, and which is shown as a general increase in the aortic shadow.

*Pericardial Effusion* gives a marked change in the appearance of the heart shadow. The various curves seen in the outline of the normal heart are obliterated. It assumes roughly a triangular shape. The angles between the heart and diaphragm are not necessarily absent. They may become more acute. The pulsations may not be visible.

The most important finding is the change of shape of the heart shadow with change of position. With the patient in the upright position if there is free fluid in the pericardium the shadow will assume somewhat the appearance of a water bottle, the upper portion of the shadow being narrowed, and the lower portion or that nearest the diaphragm widened. In the prone position the shadow assumes roughly the appearance of a rectangle. There is an increase in the upper portion and a decrease in the lower. The amount of the change may be very slight, and in order to detect it it may be necessary to make careful tracings and to superimpose them.

Fig. 12a.—(Same as Fig. 12. Tube film distance two feet.) Note marked distortion and enlargement of heart shadow.

*Adhesive Pericarditis.* Here the shape of the heart outline may not be in any way affected. It is usually increased in size and rather indistinct. The most significant finding is an absence or marked limitation of the respiratory movements of the heart, as compared with those of the diaphragm.

*The Functional Murmurs* do not produce any change in the size of the heart, and can be differentiated from organic murmurs by the absence of enlargement. It is in this particular type of case that the accurate measurements of the heart, obtained by the x-ray, are of especial value. We have found this method particularly useful in the examination of recruits.

*Valvular Lesions* show an enlargement of the chamber of the heart corresponding to the valves affected. Some of these changes are quite characteristic. They help to confirm the diagnosis, and it is possible in many cases to make a definite diagnosis from the x-ray findings alone.

*Dilated or Hypertrophied Hearts* show a corresponding enlargement of the heart shadow. In hypertrophy the apex is more rounded and blunt. Usually the x-ray findings do not add particularly to the diagnosis, but it is sometimes desirable to keep an accurate record of the size of the heart from month to month in these cases, or it may be necessary to differentiate a dilated heart from a pericardial effusion. The dilated hearts do not change shape with change of position. In questions of nephritis it is sometimes important to demonstrate a small amount of hypertrophy of the left ventricle.

*Myocardial Changes* are made manifest by changes in the strength, rapidity or irregularity of the pulsations of the various chambers.

*Heart Block* can usually be demonstrated unless the pulsations are too rapid.

*Auricular Fibrillation* is usually seen as an absence of pulsations in the auricles, which are very much enlarged, whereas the beat and size of the ventricle are more nearly normal.

*Congenital Abnormalities* are differentiated by their unusual deformity of the heart shadows.

*Displacement of the Heart Shadow,* due to tumors, fluid, or other lesions in the chest, are usually demonstrated more accurately by this method than by percussion.

## TECHNIC.

It is not necessary in a discussion of this kind, to take up (to any great extent) the technic used in this work. I will, however, call attention to a few important points:

In order to obtain the heart shadow without magnification it is necessary to have the focal spot of the tube at a distance of at least six feet from the radiographic plate. With modern apparatus it is possible to obtain good diagnostic plates at this distance.

Especial care should be taken to avoid rotation of the patient. The central rays from the tube should pass through the chest in the antero-posterior plane. It is not desirable for the patient to hold the breath. If he is requested to do so he is apt to fill the lungs preparatory to the exposure, and the result obtained will be the shadow of the heart in deep inspiration, which changes both its shape and position. It is better to make the exposure during normal breathing.

The exposure should be long enough to cover a full heart cycle. Otherwise the outline obtained may be either in diastole or systole. The phase of diastole is the one desired, and will be obtained if the exposure covers a complete heart cycle.

A fluoroscopic observation should be made in every case in order that the pulsation and movements may be studied.

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### DISCUSSION.

Dr. H. A. Christian, Boston: Mr. Chairman, Ladies and Gentlemen: The first thing to call your attention to is the very practical and very excellent selection that the chairmen of the Sections have made, both of speakers and material for discussion. The next thing I would like to call your attention to is the work of Sir James Mackenzie, not so much what he has said here, but what he has done in his own work, namely, in following the development of the cardiac case.

What the cardiac case can do, whether it is undergoing pregnancy, surviving a surgical operation, or meeting the ordinary stress of life, isn't to be found out by those who see cases in consultation or work in the wards of general hospitals, but by the general practitioner, who sees patients for a long time—over a period of years; and a great deal of exact knowledge awaits the general practitioner, who makes observations on patients and weighs them carefully, and reports them, not after a few years, but after a long number of years, and to that man awaits some of the success that Sir James Mackenzie had in his work. In Bromley, England, a small country town, he worked, and in those early days nobody ever heard of him, and fifteen years ago he went to London as a consultant and began to express what he had learned, and the world began to learn of it, and, strangely, not the English world. He was much less known in England than he was in America. His writings, his new point of view, had made their impression first on the American public, later on the English public.

It is obviously impossible to discuss a large number of papers, even though they are on the same subject, and I want merely to emphasize a few points. The first one of these is that the problem of whether the cardiac case can undergo pregnancy or not is a distinct problem from the one of whether the cardiac case can be safely operated upon. There are two reasons: one is that the stress of pregnancy is a different kind of stress from that of a surgical operation, both as to character and as to duration; and the second is that the pregnancy concerns the individual under 40, in most cases much under 40 years of age. A great deal of the surgery concerns the individual from 35 or 40 years of age upward. The cardiac lesions that are serious are different in the individual under 40 than in the individual over 40. For instance, the systolic murmur alone is of almost no significance under 40; it is practically negligible. After 40 it may accompany a very serious myocardial lesion; not always is this true, because after 40 it may be equally unimportant, but the chances are that after 40 the systolic murmur is of significance, not in itself but as an accompaniment of myocardial lesion. Just the same thing applies to the arrhythmias. The irregular heart under 40, except where there is a valve lesion such as mitral stenosis or aortic insufficiency, is usually an unimportant fact. Usually the irregularity is due to extra systoles, and as a rule they are unimportant and they have very little influence in determining whether a patient can undergo stress or strain. On the other hand, irregularities after 40 are likely to be of much more significance, because most of the cases of auricular fibrillation without mitral stenosis come after 40, and they are always of serious import, though by no means always contraindicating a surgical operation.

There has not been a great amount of consecutive observation by competent internists on the cases that undergo surgical operation, and the same thing is true of cases in relation to pregnancy; and by competent internists I mean the man that has the modern conception of the cardiac problem as not being a question of valvular lesion but a question of myocardial efficiency. In December, 1917, the *Journal of the American Medical Association* published a paper from the Mayo Clinic which is very instructive in that it represents the study by modern methods of a considerable number of cases that were subsequently operated on at the Mayo Clinic and were then followed. I will read from the *Journal* of December 15, 1917: "Surgical intervention should not be undertaken in a cardiopath unless there is definite reason to believe that the surgical relief is essential to reasonable health or will improve the cardiac condition. 'Meddlesome surgery' has a fuller meaning in treating cardiopaths." That last sentence coming from a surgical clinic is a distinct criticism of surgery. I presume as it came from a surgical clinic, it is a just criticism. The first part of the quoted paragraph brings out two things: First, that if the surgery is essential to reasonable health, it is in that sense necessary; and as the paper goes on to show, in most cardiac lesions, surgery can be carried out with success if reasonable attention is given to the anesthesia, as emphasized by Dr. Richardson. The other important point which I want to emphasize in that sentence is one that has not been so commonly kept in mind, namely, that the surgery may improve the cardiac condition; in other words, there are a great many conditions—take, for example, a chronic cholecystitis where the patient has a heart lesion—in which not only will the patient's health in general be better as a result of the operation on account of removing symptoms, but in a considerable number of cases the cardiac condition may greatly improve. It is the problem of the source of the toxin, the source of the infection, and its effect on the myocardium. Of course, we always think of diseased tonsils and the benefit their removal may bring to the heart, and the same thing is applicable to many other things on which the surgeon is called to operate; and that is the reason to my mind for advising the patient to be operated on, notwithstanding increased risk from the damaged heart, because you are looking forward to two goods—to the patient's improvement directly from the surgery, and improvement indirectly in the cardiac condition because you are removing a source of toxins.

One point, I think, is of importance in considering cardiac cases, as to whether they should have anesthesia, and that is the presence of signs of passive congestion, namely, râles in the bases of the lungs. I have a distinct feeling that the pulmonary after-effects of anesthesia often are due to operating on the patient when there is still chronic passive congestion of the lungs that would have been removed by appropriate treatment of the heart for ten days prior to the operation. Of course that only applies to such cases when the necessity for operation isn't immediate.

I am glad Dr. Holmes emphasized the normal variations in the heart shadow as made out by x-ray study. I think we are inclined to neglect that sometimes in interpreting our plates. As far as the x-ray is concerned, I do not think it helps in many cases, as far as the heart is concerned. I do not mean by that that all that Dr. Holmes said isn't true. We can get evidence of the kind of heart lesions, but that evidence is obtained satisfactorily by other methods. On the other hand, I think the x-ray study is of great value when it concerns the study of diseases of the aorta, because it gives us information which we cannot get otherwise, because percussion of increases of size of retrosternal structures is very uncertain in the early stages of dilatation of the arch of the aorta, and those who are honest with themselves will know that we may fail to percuss out dilatations of marked degree of the aorta, and on physical examinations miss an important point in estimating the diseased condition of the patient. The x-ray is very accurate in determining these conditions of the arch of the aorta, and that information is often of extreme value.

The various speakers have spoken of the different forms of heart lesions in relation to surgical intervention in pregnancy, and so on. I have nothing to add except that I wish to emphasize again that the stress should not be placed on the lesions of the valves, but on the evidences of disturbance in the heart muscle, enlargement, dilatation, various forms of arrhythmia, and, most important of all, how far the patient is able to stand stress, as shown by the history of the patient, indicating whether there has been in the past any symptoms of broken compensation, and the test of the patient,—simple tests,—to see whether they get unduly breathless or have pain or other symptoms of cardiac disturbance when they are submitted to moderate degrees of exercise. The test can be carried out only in that group of patients in whom the surgical condition is not one that particularly incapacitates them. The history can be obtained on all patients, and what Sir James Mackenzie emphasized—on the importance of symptoms—is very applicable there. From the symptomatology you can get a good idea of how much that patient has been able to do without embarrassing the circulation. It does not make much difference what sort of a murmur the patient has, it does not make so much difference about the irregularities of the heart, if the patient has been able to do physical exercise without breathlessness, pain or other cardiac symptoms. As an example of that, there is a long-distance swimmer here in Boston who swims long distances down the harbor and has the most typical signs of mitral stenosis that you can imagine,—a perfectly typical case to give the students beginning diagnosis, yet she swims for many miles in cold water and enjoys the exercise. There is a famous football player who participated in all sorts of exercises during his years in college, and his heart was invariably irregular, yet it was functionally sound. Any patient who can do a reasonable amount of exercise can stand surgery, because surgery, after all, is not a very severe strain, and to a less extent they can stand the strain of pregnancy.

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## Book Reviews.

*Food Poisoning.* By Edward Oakes Jordan. Chicago: The University of Chicago Press. 1917.

This volume is an analysis of the source and nature of food poisoning. The problem is one which has not received sufficient consideration, due to the fact that few cases are reported. Food poisoning is caused either by some injurious constituent in the food itself or by some peculiar condition of the individual. The articles of food most commonly responsible for food poisoning are: meat, milk, ice-cream, imperfectly cooked food, raw sausage, and canned goods. Several phases of the food poisoning problem are presented: sensitization to protein foods, poisonous plants and animals, mineral or organic poisons added to food, food-borne pathogenic bacteria, animal parasites, poisonous products formed in food by bacteria and other micro-organisms, and poisoning of obscure or unknown nature. The author emphasizes the need of further investigation of every food poisoning outbreak in order that the origin of unexplained food poisoning may be recognized.

*The Sense of Taste.* By H. L. Hollingsworth, Ph.D., and A. T. Poffenberger, Jr., Ph.D. New York: Moffat, Yard and Company. 1917.

This volume is an interesting survey of the phenomena and laws of the sense of taste. The author believes that taste is important not only as a discriminating factor in the acceptance or rejection of food, but also as a stimulus to the digestive and assimilative processes of the organism. This book attempts to portray man's contact with the outer world through the sense of taste. The actual experiences which the sense of taste affords are considered: their character, elementary qualities, classification, relation and combination. Among other topics considered are: the sensitiveness of taste, the time relations of taste qualities, various special characteristics and phenomena of normal and abnormal tastes, the mechanism and function of the organ of taste, its structure and anatomy, its evolution in the individual and in the lower animal forms, and the esthetic value of taste.

*Handicaps of Childhood.* By H. Addington Bruce. New York: Dodd, Mead and Company. 1917.

"Handicaps of Childhood" presents in an illuminating way the responsibility of parents in developing their children by early mental and moral training. Mr. Bruce shows how the recent discoveries in child psychology are revolutionizing the methods of dealing with children. This book reveals the various aspects of the child's consciousness, and corrective measures are suggested for overcoming eccentricities in behaviour, so that the child may be brought into the right relation with the world about him. Such handicaps as mental backwardness, sulkiness, jealousy, selfishness, bashfulness, stammering and night terrors often result in serious consequences which the parent might avert. The author believes that early training, particularly in the moral sphere, is the greatest contribution parents can make to the next generation.

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## OFFICIAL ANNOUNCEMENT: THE VOLUNTEER MEDICAL SERVICE CORPS.

### An Appeal to Executive Committees and County Representatives of the Volunteer Medical Service Corps, and State Committees of the Council of National Defense.

No official or committeemen representing the Volunteer Medical Service Corps or the General Medical Board of the Council of National Defense, is now authorized or has been authorized to favor any organized or unorganized method of coercion in inducing members of the medical profession to join the Medical Corps of the Army or Navy, or the Volunteer Medical Service Corps. Our committeemen are especially urged against favoring any movement that would threaten to impair a medical man's standing in his local, state or national society because he refused to enroll in the Army or Navy, or the Volunteer Medical Service Corps.

*It must be made clear that the Volunteer Medical Service Corps is a volunteer organization, which has for its object the enrollment and classification of the profession.* Its members are entitled to wear an insignia which will clearly indicate that they have offered their services to the Government, when such services are needed. Patriotism cannot be created by coercion. It also must be made clear that the Volunteer Medical Service Corps has for its primary object, furnishing its classification to the Army, the Navy, the Public Health Service, the Red Cross and Provost Marshal, as well as to civilian institutions and communities, as a guide, in providing for their needs to the best advantage.

The object of the Corps is not to disturb any medical man in the performance of any duty to which he has been assigned by any governmental agency either for service at the front or at home.

(Signed)

Edward P. Davis, *President*,
Volunteer Medical Service Corps.
Franklin Martin, *Chairman*,
General Medical Board, Council of National Defense.

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## VOLUNTEER MEDICAL SERVICE CORPS.

It is singularly unfortunate that a certain amount of opposition to the Volunteer Medical Service Corps has developed in quarters from which it should have been least expected. In another column of this issue of the Journal are published several pieces of correspondence bearing upon this subject, including copies of the correspondence between the Provost-Marshal General's Office and Major Thomson, relative to the Volunteer Medical Service Corps.

The Volunteer Medical Service Corps was designed primarily to save the face and maintain the dignity of the medical profession by segregating its members from the draft and insuring their universal volunteer service in this great national exigency. Whatever personal opinions as to methods of administration may be, it manifestly defeats the purpose of the organization if any appreciable number of physicians fail to enter it. To antagonize the plan of the Volunteer Medical Service Corps is to oppose, perhaps unconsciously, the principle of universality of service.

In private conversation, several physicians have said that they did not wish to join the Volunteer Medical Service Corps because to do so was equivalent to giving the Government a blank check on oneself. Surely the present crisis in the world's history is one in which that is exactly what every one should wish to do.

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## AMERICAN PUBLIC HEALTH ASSOCIATION.

The United States Public Health Service is asking Congress for a ten million dollar deficiency appropriation for war-time health purposes. The efforts of the Service is to be concentrated in communities congested by war preparations, such as industrial centers, various surrounding cantonments, and shipyards.

The consideration of the war program of the Public Health Service will take up a full session on Tuesday evening, October 15, at the annual meeting of the American Public Health Association. Surgeon-General Blue, Assistant Surgeons General McLaughlin, Schereschewsky, and Warren, and Surgeon J. O. Cobb, will outline the plans of the Public Health Service in detail. A round-table discussion will follow these presentations.

The passage of Senate Resolution 63 is advocated. This proposes to establish a Sanitary Reserve Corps and the commissioning in the Public Health Service of men of national repute in the various phases of health administration.

Full-time health officers for all States is urged, and also for municipalities. In larger communities a health appropriation of fifty cents per capita will be recommended, with a minimum appropriation of five thousand per annum for smaller towns.

The full program of the Public Health Service is printed in the issue of Public Health Reports of September 27, and all interested, especially those who expect to attend the annual meeting of the American Public Health Association, are requested to study this article. It contemplates a thorough supervision of all war industries and communities surrounding them; railway sanitation for the benefit of both employees and the traveling public; supervision of milk, water, and food supplies; infant welfare, etc.

Among the other speakers at the American Public Health Association Convention will be the following:

Col. V. C. Vaughan, M.C. "The Health of the Civil Population in War Time."

Major William H. Welch, M.C. "Some Public Health Problems and Opportunities Created by the War."

Dr. Charles J. Hastings. Presidential Address.

Dr. George E. Vincent, President, Rockefeller Foundation. "Team-play for Public Health."

Lee K. Frankel, Ph.D., Treasurer, American Public Health Association. "Future of the American Public Health Association."

Ernest S. Bishop, M.D., New York Polyclinic Medical School. "War-time Importance of Narcotic Drug Addiction."

As usual, there will also be section meetings devoted to public health administration, industrial hygiene, laboratory, vital statistics, food and drugs, sanitary engineering, and sociological health problems.

The convention will be held October 14-17, with headquarters at Hotel Morrison, Chicago.

Programs may be obtained from the secretary of the American Public Health Association, 126 Massachusetts Avenue, Boston.

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## THE GRIP SITUATION: A CORRECTION.

In last week's issue of the *Journal*, we regret to say, Dr. Walter L. Burrage was misquoted in his alleged statement about the seriousness of the prevalent epidemic of influenza. As a matter of fact, Dr. Burrage made no statement in this regard to the public, nor was it his personal opinion that the situation is not made more difficult by the shortage of civilian physicians.

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## MEDICAL NOTES.

**New Laboratory Given to Santa Barbara.**—One of the finest laboratories and clinics for research work in medicine and surgery is to be provided for Santa Barbara by several of its citizens. The building is to be built at the Cottage Hospital, as another wing of the present structure, and will be used by Dr. Nathanial Bowditch Potter for research study in connection with diabetes, Bright's disease, and kindred ailments.

### WAR NOTES.

**APPOINTMENTS IN MEDICAL RESERVE CORPS.**—The following appointments in the Medical Reserve Corps have been announced:

Captains: Walter Fullerton, Brockton; Frederick Everett, Springfield.

First Lieutenants: Joseph Devenny, Dorchester; Dana Downing, Westboro.

**ARMY AND NAVY MEDICAL CORPS.**—Applicants for the Medical Corps of the Army should make application either to Capt. John T. Bottomley, 165 Beacon Street, Boston, or to Capt. Philip Kilroy, 61 Chestnut Street, Springfield. The examiners have application blanks, and will communicate all details as to membership in the Corps. Applicants for the Medical Corps of the Navy should apply to Capt. John M. Edgar, Naval Aid Department, Little Building, 80 Boylston Street, Boston. Captain Edgar has the application blanks, and will give full information as to the requirements and the physical examination.

### BOSTON AND MASSACHUSETTS.

**WEEK'S DEATH RATE IN BOSTON.**—During the week ending Sept. 28, 1918, the number of deaths reported was 992, against 230 last year, with a rate of 65.95, against 15.53 last year. There were 68 deaths under one year of age, against 65 last year.

The number of cases of principal reportable diseases were: diphtheria, 35; scarlet fever, 6; measles, 3; whooping cough, 34; typhoid fever, 3; tuberculosis, 51.

Included in the above were the following cases of non-residents: diphtheria, 7; scarlet fever, 2; whooping cough, 1; tuberculosis, 3.

Total deaths from these diseases were: diphtheria, 1; whooping cough, 12; typhoid fever, 1; tuberculosis, 25.

Included in the above were the following non-residents: whooping cough, 4; tuberculosis, 2.

## Miscellany.

## VOLUNTEER MEDICAL SERVICE CORPS OF THE UNITED STATES.

AUTHORIZED BY THE COUNCIL OF NATIONAL DEFENSE AND APPROVED BY THE PRESIDENT OF THE UNITED STATES.

### INFORMATION.

1. *What is the Volunteer Medical Service Corps?*—The Volunteer Medical Service Corps is an organization which provides means for obtaining quickly men and women for any military or civil medical service required in the war emergency. It furnishes recommendations and necessary credentials to assure the best medical service, both military and civil.

2. *How should application for membership be made?*—Upon request to the Volunteer Medical Service Corps, Council of National Defense, Washington, D. C., application blanks and circulars of information will be sent. When received, the application form should be filled out completely, in accordance with instructions contained in the circular of information. The application should then be mailed to the Volunteer Medical Service Corps, Council of National Defense, Washington, D. C.

3. *What is to be gained by the creation of this organization?*—Placing on record all medical men and women in the United States; aiding Army, Navy, Public Health Service, Provost Marshal General's Office and the American Red Cross in supplying war medical needs; providing the best civilian medical service possible; giving recognition to all who record themselves either in Army, Navy, Public Health Service, Provost Marshal General's Office, Red Cross activities or civilian service.

4. *What is meant by classification?*—It is the record of information furnished by the individual physician so that when the need arises, he may be requested to perform service that will be mutually advantageous to the individual and the service to which he may be assigned.

5. *Who are eligible?*—Every legally qualified physician holding the degree of Doctor of Medicine from a legally chartered medical school without reference to age or physical disability is eligible for membership in the Volunteer Medical Service Corps provided he or she is not already commissioned in the Government service.

6. *How is eligibility to the Corps determined?*—Upon information obtained from application blanks, three personal references and the Executive Committee of the state in which the applicant resides. Based upon the information thus secured, the Central Governing Board will finally pass upon applications.

7. *Does membership in the Corps carry with*

***it rank and pay?***—This Corps is not authorized to bestow rank. Arrangements for compensation shall be made between a member requested to perform a specific duty and the agency requesting service. The matter of compensation and place of service whether with or without rank must be determined at the time said request is made. When a member of the Corps accepts service in the Medical Service Corps of the Army, the Naval Reserve Force, the United States Public Health Service, the American Red Cross or any governmental department, he or she will be accorded the rank and pay incident to the service in the department in which he or she has enrolled.

8. ***Will any member of this Corps be ordered to active duty?***—No member will be *ordered* to render any service. Requests to perform specific duties according to qualifications and availability under the classification of the Volunteer Medical Service Corps may be made from time to time as emergencies arise.

9. *What will be the probable character of service member will be requested to render?*—

(a) Medical Reserve Corps.
(b) Naval Reserve Force.
(c) United States Public Health Service.
(d) American Red Cross.
(e) Local and medical advisory boards.
(f) State and local health departments.
(g) Medical Schools and Hospitals.
(h) Industrial plants.
(i) Civil communities.
  Caring for civil communities, stripped of medical attention.
  Caring for practices of physicians in military service.
  Reclamation of registrants rejected for physical unfitness.
  Services to needy families and dependents of enlisted men.
(j) Miscellaneous service.

10. ***If members of the Corps are recommended for active military or naval service, in what order will they be recommended?***

(a) Physicians under 55 years of age without dependents and without physical disabilities which are disqualifying will first be recommended. Following this group, physicians under 55 years of age without obvious physical disabilities which are disqualifying and with not more than one dependent in addition to self (Class I of the Volunteer Medical Service Corps) will be among the first to be recommended for actual war service. Any physician under 55 years of age who is without an obvious physical disability which is disqualifying and whose dependents have an income sufficient for the support of dependents other than that derived from the practice of his profession, may be recommended to enroll in the Medical Reserve Corps of the Army, the Naval Reserve Force or the United States Public Health Service, when, in the opinion of the respective Surgeons General, his services are needed.

(b) Physicians under 55 years of age without obvious physical disabilities which are disqualifying and with not more than three dependents in addition to self (Class II of the Volunteer Medical Service Corps) will be the next group to be recommended to apply for active military or naval service.

(c) The next group recommended to enroll for active duty with the Army, Navy or Public Health Service (Class III), will be physicians under 55 years of age who are without obvious physical disabilities which are disqualifying and with more than three dependents in addition to self.

11. ***What are the exceptions in these groups?***—The exceptions in the above groups of physicians are as follows:

(a) Those essential to communities.
(b) Those essential to medical schools and hospitals.
(c) Those essential to health departments.
(d) Those essential to industries.
(e) Those essential to local and medical advisory boards.

12. ***How will exceptions to these groups be determined?***

(a) ***Essential to communities.***—Essential community need will be determined by the Central Governing Board on recommendation of representatives of the Central Governing Board appointed by the Board to make a survey of local conditions.

(b) ***Essential to institutions.***—Essential institutional need will be established after conference between representatives of the Central Governing Board of the Volunteer Medical Service Corps and representatives appointed by the governing bodies of the institutions concerned.

(c) ***Essential to health departments.***—Essential health department need will be determined after conference between representatives of the Central Governing Board, Volunteer Medical Service Corps and representatives of health departments.

(d) ***Essential to industries.***—Essential industrial need will be determined after conference between representatives of the Central Governing Board, Volunteer Medical Service Corps and accredited representatives of industries involved.

(e) ***Essential to local and medical advisory boards.***—Essential local and medical advisory board needs will be determined after conference between representatives of the Central Governing Board, Volunteer Medical Service Corps and representatives of the Provost Marshal General's Office.

13. ***When will physicians who are not classified for actual military or naval service be requested to perform service?***—When the emergency arises the following may be requested to perform duties in accordance with their qualifications and expressed merits as indicated by the information contained on their application blanks:

(a) Physicians over 55 years of age.

(b) Physicians with obvious physical disabilities which are disqualifying.

(c) Those rejected for all government service because of physical disability.

14. *What are some of the duties that this last group of physicians ineligible for active military service may be requested to perform?*

(a) Deducting those members of the medical profession who will eventually be in active military, naval or public health service, fully 75 per cent. of the remainder will be encouraged to continue at the home duties.

(b) Some of these may be called upon to supplement their private practices by performing part time service to meet community needs hitherto performed by men called to active duty.

(c) Twenty-five per cent. of those not actually engaged in war service (possibly 20,000 in number) who are not engaged in home duties but who have agreed to do work of any kind, anywhere, upon request of the Central Governing Board, will as the emergency arises be recommended for duty in the following places:

1. Local and medical advisory boards.
2. Medical Schools and Hospitals.
3. Industrial plants.
4. Health Departments.
5. Communities lacking medical service.

15. *How does enrollment in this Corps differ from actual conscription?*—The Volunteer Medical Service Corps is exactly what its name indicates. It is a gentleman's agreement on the part of the civilian doctors of the United States who have not yet been commissioned in the Army or Navy or enrolled in the Public Health Service, or in the service of the Provost Marshal General, and a representative board consisting of government officials associated with lay members of the profession in which the civilian physicians agree to offer their services to the Government if requested to do so by the Central Governing Board.

16. *In what way can this Corps aid the Government?*—By recording all physicians who are not yet in service and classifying them so as to utilize the talents and facilities of individuals to the best advantage and inflict as little hardship on the individual as possible, in accordance with the letter from the President of the United States authorizing the Corps—"to supply the needs of the Army, Navy and Public Health Service * * * aiding in the important work of the Provost Marshal General's Office and Red Cross * * * and the problems of the health of the civilian communities of the United States." It provides a method by which every physician not in uniform will be entitled to wear an insignia which indicates his willingness to serve his Government. It furnishes a method by which the medical needs of the nation may be provided for through a representative board of physicians who know the needs of the Army, Navy, Public Health Service, Red Cross and civil communities.

17. *To what extent must provision be made for essential civilian and industrial medical needs?*—A large percentage of the physicians of the country will be required to care for their respective home communities and to meet civilian health needs. This percentage of necessity will be expected to maintain their home status and continue their professional work.

18. *Will enrollment in the Volunteer Medical Service Corps excuse a physician in the draft age from registration under the Selective Service Law or from being classified therein?*—Positively not.

19. *Why then enroll in the Volunteer Medical Service Corps if it does not supplant the draft?*

(a) Under the Selective Service Law individuals in the draft age are registered and inducted into the service as privates. The Volunteer Medical Service Corps enrolls and classifies individuals as prospective commissioned officers and will when requested assist in establishing the individual's status when he requests transfer from the enlisted forces to the commissioned branches of the service.

(b) Enrollment in the Volunteer Medical Service Corps definitely registers the physician as a patriot and provides definite governmental recognition of his willingness to serve.

20. *Why should every physician in the United States enroll in the Volunteer Medical Service Corps?*

(a) The unsurpassed record of volunteer enrollment for actual service on the part of the medical profession must be maintained.

(b) The Army and the Navy must not be hampered for a moment for lack of doctors to care for the sick and wounded boys fighting our battles at the front.

(c) The public health must be conserved.

(d) The medical needs of the Provost Marshal General must be adequately met.

(e) The great industries furnishing materials of war, employing thousands of patriotic workers, must have medical service.

(f) The home folks, the old and the young, wearily waiting over here, must have doctors.

(g) Recording, classifying, and careful distribution and full utilization of our entire profession of medicine will enable us instantly to supply all demands, and our utmost resources will then be available to aid in establishing a permanent peace that will forever make this world a safe place in which women and children may live.

## Correspondence.

### VOLUNTEER MEDICAL SERVICE CORPS.

[The following correspondence deals with various aspects of the project of the Volunteer Medical Service Corps.]

### I.

Boston, Mass., Sept. 4, 1918.

To: The Provost Marshal-General, U. S. Army,
Washington, D. C.
Subject: The exemption of workers in the campaign against venereal disease.

1. Attention is invited to the enclosed correspondence.

2. Attention is invited to the fact that the recruiting drive of the Council of National Defense has disrupted the already efficient clinics for venereal disease in New England and is making it impossible to provide additional facilities which are sorely needed.

3. In the attempt to reach the draftee, in compliance with P. M. G. O. Form 76, clinical facilities for the treatment of cases found among the draftees are vitally necessary and the State venereal disease control officers, coöperating with the U. S. P. H. Service, are at present and will be in the future greatly handicapped without adequate medical and lay personnel.

4. Instruction and advice are requested on this matter so that we shall be able to formulate a definite policy, and it is respectfully suggested that the Provost Marshal-General notify the State Health Departments of the action that may be taken and that some type of instruction be issued to the Council of National Defense in this regard.

Alec N. Thomson, *Major, M.C., U.S. Army,*
State House, Boston, Mass.

### II.

Sept. 5, 1918.

To: Provost Marshal-General, U.S.A., Washington, D. C.
Subject: Maintenance of civilian personnel in combating venereal disease.

1. The attached correspondence is self-explanatory and is forwarded to receive instruction so that I may comply with the request of the Boston Dispensary and other institutions of similar character for information on this vital subject.

2. It is becoming increasingly more difficult to establish new clinics and maintain the existing clinics because of the active recruiting drive being carried on under the auspices of the Council of National Defense for physicians to make applications for commissions. The feeling is general that any physician is unpatriotic who, realizing his peculiar relation to the War Department's effort to control venereal disease, does not immediately fill out an application blank. This is unfortunate and, if possible, should be counteracted by some definite statement.

Alec N. Thomson, *Major, M.C., U.S.A.,*
Chief, Subdivision of Venereal Disease,
State House, Boston, Mass.

### III.

War Dept., P.M.G.O., September 10, 1918.

To. Alec N. Thomson, Major, M.C., U.S.A.,
State House, Boston, Mass.

1. Referring to Paragraph 4 of your letter of September 4, it is not probable that the Provost Marshal-General will issue instructions of a specific nature directly to organizations not a branch of the Government nor functioning under him.

2. The Medical Section of the Advisory Committee of the Council of National Defense is not recognized as such branch of the Government, but is a very active body, interesting itself with physicians.

3. The District Boards will have instructions issued to them under which they may give deferred classification to necessary men engaged in essential occupations or industries, upon claim supported by satisfactory evidence submitted by their employers.

4. No physician should be stigmatized as unpatriotic who continues to perform a manifest duty to Draft Boards, public health organizations or to his dependents first.

E. H. Crowder, *Provost Marshal-General.*
By F. R. Keefer, *Colonel, M.C.,*
Chief, Medical Division.

### IV.

Boston, Mass., Sept. 10, 1918.

*Mr. Editor:—*

The enclosed clipping, from *The Journal of the American Medical Association* of Sept. 7, 1918, is such an admirable critique of the Volunteer Medical Service Corps that it deserves wide reading. Those of us who have been struggling with the problems of keeping our civil hospitals going and of providing teachers for our medical schools, have been so much handicapped by the activity of the committees of one sort or another who besiege the men with conflicting requests and advice, that we endorse heartily the opinion of the *Journal of the American Medical Association* in regard to the Volunteer Medical Service Corps.

Will you be good enough to publish this clipping and, if you desire so to do, also my letter in the Boston Medical and Surgical Journal.

Yours truly,
Henry A. Christian.

(Clipping.)

*To the Editor:—*There seems to be a considerable variation of opinion in regard to the Volunteer Medical Service Corps. Martin and his element seem to be pushing things with a pretty high hand, with their committees, sub-committees, little buttons, regulations —everybody to register or sign up. We are at a loss to know what is right. W. E., Michigan.

**Answer.**—The formation of a new and special organization for the purpose of enlisting physicians in war service has from the beginning seemed to *The Journal* unnecessary and unwise. The needs of the Army and Navy have been met promptly so far by voluntary enlistments, and there has been no indication that the needs of the future would not have been satisfied in the same way, even under the volunteer system. However, the passing of the new selective service law now renders such an indefinite and indeterminate society as the Volunteer Medical Service Corps superfluous and uncalled for. The vigorous promotion of this organization is creating a regrettable confusion and anxiety among physicians that should be avoided in these trying times. This is no time to fritter away energy in the construction and maintenance of intricate machinery of questionable value to do work which is being done and will be accomplished satisfactorily through regularly established channels.

Every man, including physicians, under 46 years of age, must register on September 12. The selective service boards are the only bodies empowered to dispose of those registered under the law. This will be done under the regulations promulgated by the Provost Marshal-General. Undoubtedly special regulations for the guidance of those boards will be worked out by the Provost Marshal-General conferring with the Surgeon-Generals. So far as those above 46 years of age are concerned: They will have in the future, the same privilege of volunteering as they have had in the past. The operation of the new selective service law will, without doubt, take into account the needs of the civilian population while providing for the medical requirements of the government.